

## Voyager USB 5Gbps & 10Gbps Compliance Suite

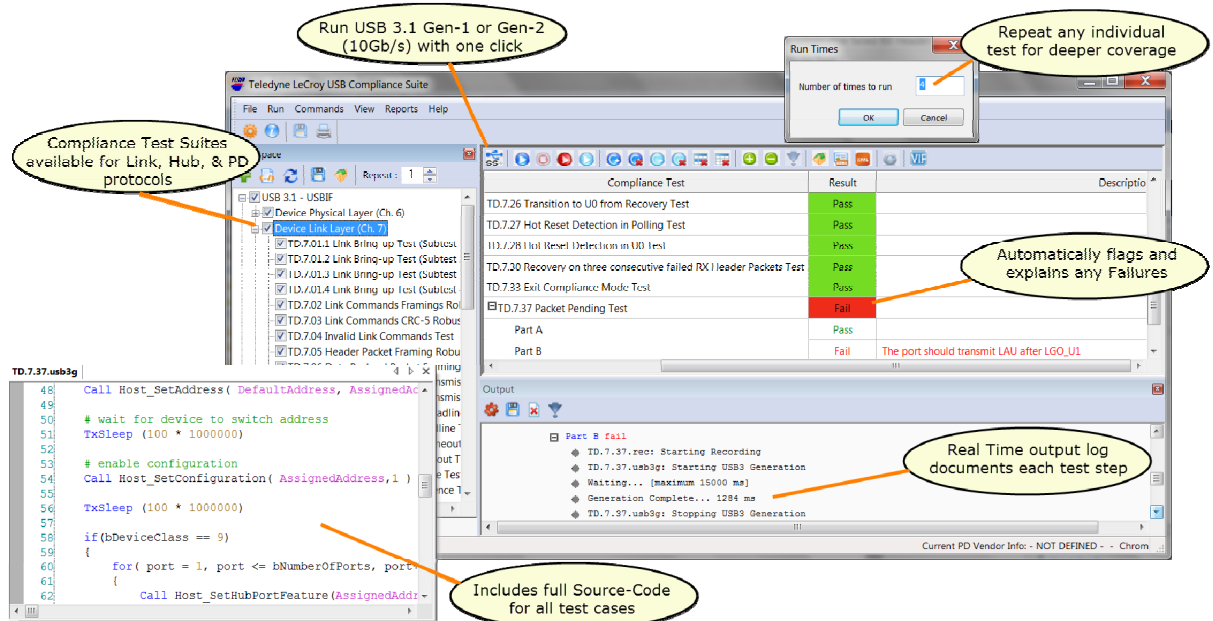
### Voyager USB Compliance Suite (M310e, M4x, & M3x)

The Voyager USB Compliance Suite allows developers to verify devices are compliant with the USB 3.2 Link Layer specification. The Voyager platform along with the USB Compliance Suite software is an approved Link Verification System (LVS) by the USB-IF for performing conformance testing for USB 3.1 (Gen 1 & Gen 2) Link Layer test specification (July-2019). Offering comprehensive link layer test coverage, the Voyager system can verify devices properly implement link training, link recovery, power management and other link layer behaviors (chapter 7). The platform also addresses several PHY layer test cases (chapter 6) to verify LFPS and SKIP behaviors also defined in the USB 3.2 Link Layer compliance specification. Operating as a turn-key test solution, it automatically validates each individual compliance point required by the USB-IF's Link Layer test specification.



### Key Features

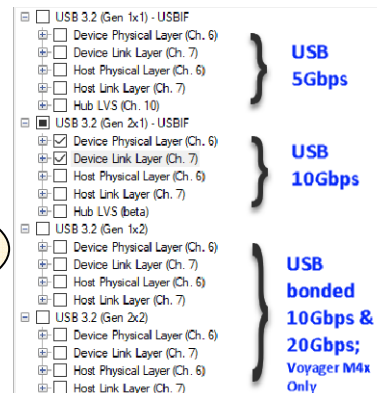
The Compliance Suite is based on Teledyne LeCroy's automation framework and uses emulation scripts to mimic USB link behaviors. The system initiates and responds to USB frames like a real device while analyzing the response from the device-under-test. It communicates directly over USB cabling and generates pass/fail reports to provide a fully automated test suite for protocol compliance.



## Test Coverage

The USB test suites are Integrated in Teledyne LeCroy's USB Compliance Suite application (Right). These automated test suites are each sold separately as licensed options allowing users to enable only the tests that they require. Compliance tests are updated regularly, and customers will receive all maintenance releases at no additional cost.

These automated test suites are each sold separately as licensed options for the Voyager verification platform



## USB-IF Link Layer Tests

The Link Layer Compliance Suite includes 100% coverage for the USB-IF's USB 3.1 Link Layer Test Specification (version .96). The tests below can operate at USB 3.1 Gen-1 or Gen-2 speed. As of July-2019, the Teledyne LeCroy Voyager (M310P, M310e & M4x) is the only Link Verification System (LVS) available for Gen-2 link layer compliance.

| Chapter 7 Link Layer (USB-IF Specification)             |                                                                          |
|---------------------------------------------------------|--------------------------------------------------------------------------|
| TD.7.01 Link Bring-up Test                              | TD.7.22 PM_ENTRY_TIMER Timeout Test (US port only)                       |
| TD.7.02 Link Commands Framings Robustness Test          | TD.7.23 Accepted Power Management Transaction for U1 Test (US port only) |
| TD.7.03 Link Commands CRC-5 Robustness Test             | TD.7.24 Accepted Power Management Transaction for U2 Test (US port only) |
| TD.7.04 Invalid Link Commands Test                      | TD.7.25 Accepted Power Management Transaction for U3 Test (US port only) |
| TD.7.05 Header Packet Framing Robustness Test           | TD.7.26 Transition to U0 from Recovery Test                              |
| TD.7.06 Data Payload Packet Framing Robustness Test     | TD.7.27 Hot Reset Detection in Polling Test                              |
| TD.7.07 RX Header Packet Retransmission Test            | TD.7.28 Hot Reset Detection in U0 Test                                   |
| TD.7.08 TX Header Packet Retransmission Test            | TD.7.29 Hot Reset Initiation in U0 Test (Downstream Port Only)           |
| TD.7.09 PENDING_HP_TIMER Deadline Test                  | TD.7.30 Recovery on three consecutive failed RX Header Packets Test      |
| TD.7.10 CREDIT_HP_TIMER Deadline Test                   | TD.7.31 Hot Reset Failure Test (Downstream Port Only)                    |
| TD.7.11 PENDING_HP_TIMER Timeout Test                   | TD.7.32 Warm Reset Rx.Detect Timeout Test (Hub Downstream Port Only)     |
| TD.7.12 CREDIT_HP_TIMER Timeout Test                    | TD.7.33 Exit Compliance Mode Test (Upstream Port Only)                   |
| TD.7.13 Wrong Header Sequence Test                      | TD.7.34 Exit Compliance Mode Test (Downstream Port Only)                 |
| TD.7.14 Wrong LGOOD_N Sequence Test                     | TD.7.35 Exit U3 by Reset Test (Downstream Port Only)                     |
| TD.7.15 Wrong LCRD_X Sequence Test                      | TD.7.36 Exit U3 Test (Host Downstream Port Only)                         |
| TD.7.16 Link Command Missing Test                       | TD.7.37 Packet Pending Test (Upstream Port Only)                         |
| TD.7.17 tPortConfiguration Time Timeout Test            | TD.7.38 Port Capability Tiebreaker Test                                  |
| TD.7.18 Low Power initiation for U1 test (DS port only) | TD.7.39 PortMatch Retry Test (Gen 2 Only)                                |
| TD.7.19 Low Power initiation for U2 test (DS port only) | TD.7.40 Polling Retry Test (Downstream Port Only)                        |
| TD.7.20 PM_LC_TIMER Deadline Test (DS port only)        | TD.7.41 SetAddress TPF Bit Test (Gen 2 Upstream Port Only)               |
| TD.7.21 PM_LC_TIMER Timeout Test (DS port only)         | TD.7.42 Symbol to Block Alignment Test (Gen 2 Only)                      |
| Chapter 6 PHY Layer (USB-IF Specification)              |                                                                          |
| TD.6.1.1 Lane Polarity Inversion Test (No Invert)       | TD.6.4 LFPS Frequency Test                                               |
| TD.6.1 Lane Polarity Inversion Test                     | TD.6.5 Polling.LFPS Duration Test                                        |
| TD.6.2 Skip Test                                        | TD.6.6 SCD Duration Test (Gen 2 Capable Only)                            |
| TD.6.3 Elasticity Buffer Test                           | TD.6.7 PWM Duration Test (Gen 2 Capable Only)                            |

## Example Tests for USB 3.0 and USB 2.0

The USB 3.1 Compliance Suite also includes a comprehensive library of example test cases that have been provided on an 'as-is' basis. All tests in the 'example' folders are not sanctioned by the USB-IF and are not warranted to work with all USB hosts and devices. Tests include some upper layer protocol framework (chapter 9) tests cases that represent a subset of the USB-IF's *USB-Command Verifier* (USB-CV) application. Note: These tests are not actively maintained or supported and are provided only as a library to create derivative test cases:

## Key Components

Purchasing the Compliance Suite options will include all the components below. This allows users to review test criteria or adapt test cases for their own verification needs.

Host and Device Emulation scripts (.UTG & .USB3G)

- Traffic Generation scripts for USB 2.0 & 3.1

Automatic verification scripts (.VSE)

- Scripting API for post processing trace files for USB 2.0 & 3.0

Console (COM client) provides graphical interface for operating Compliance Suite

- VBS scripts for automating operation of the Voyager hardware system

HTML and text-based Compliance Reports

- Generated automatically by Compliance Suite

## Ordering Information

This table outlines part numbers needed to enable Voyager USB 5Gbps, 10Gbps & 20Gbps Compliance options:

| Test Spec                                                                    | Models                           | Description                                                                                        | QTY    | Supported on Voyager models:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>USB 3.1 Gen-1 Link Layer Compliance (5Gbps Only)</b>                      | USB-AC05-V01-A                   | Voyager USB 3.0 Compliance Suite option (Gen 1)                                                    | 1      | Must have: Voyager M310e Models (USB-TZP3-V09-X, USB-T0P3-V09-X, USB-T0A3-V09-X, USB-TZA3-V09-X); Voyager M4x Models: (USB-TZP4-V08-X, USB-T0P4-V08-X, USB-T0P3-V08-X, or USB-TZP3-V08-X) or Voyager M310P Models: (USB-TZP3-V07-X, USB-T0P3-V07-X, USB-T0A3-V07-X, USB-TZA3-V07-X); or Voyager M310C Models: (USB-TZP3-V06-X, USB-T0P3-V06-X, USB-TZA3-V06-X, USB-T0A3-V06-X); or Voyager M310 models: (USB-TZP3-V04-X, USB-T0P3-V04-X, USB-TZA3-V04-X, USB-T0A3-V04-X) or Voyager M3x models: (USB-TZP3-V03-X, USB-T0P3-V03-X, USB-T0S3-V03-X) |
| <b>USB 3.1 Gen-1 &amp; Gen-2 Link Layer Compliance (5Gbps &amp; 10Gbps)</b>  | USB-AC05-V01-A<br>USB-AC15-V01-A | Voyager USB 3.0 Compliance Suite option (Gen 1)<br>Voyager USB 3.1 Compliance Suite option (Gen 2) | 1<br>1 | Must have: Voyager M310e Models (USB-TZP3-V09-X, USB-T0P3-V09-X, USB-T0A3-V09-X, USB-TZA3-V09-X); M310P Models: (USB-TZP3-V07-X, USB-T0P3-V07-X, USB-T0A3-V07-X, USB-TZA3-V07-X) or Voyager M4x Models: (USB-TZP4-V08-X, USB-T0P4-V08-X, USB-T0P3-V08-X, or USB-TZP3-V08-X)                                                                                                                                                                                                                                                                      |
| <b>USB 3.2 Gen-1x2 (10Gbps) &amp; Gen-2x2 (20Gbps) Link Layer Compliance</b> | USB-AC32-V01-A                   | Voyager M4x USB 3.2 (Gen1x2 & Gen2x2 ) Link Layer Compliance Suite                                 | 1      | Must have: Voyager M4x Models (USB-TZP4-V08-X, USB-T0P4-V08-X, USB-T0P3-V08-X, or USB-TZP3-V08-X)<br><br>*USB 3.2 (10Gbps) & (20Gbps) Link Compliance only supported on Voyager M4x                                                                                                                                                                                                                                                                                                                                                              |

The example USB 2.0 and 3.0 Link / Framework tests operate only on Voyager exerciser enabled systems (no additional license needed). Please see the USB Power Delivery Compliance Suite; USB Type-C Compliance Suite & Hub LVS Product Bulletins for additional information on these options. For more information please contact your regional Sales Engineer 1 800 909-7211 or 408 653-1262 or [PSGsales@TeledyneLeCroy.com](mailto:PSGsales@TeledyneLeCroy.com)